and a crest line) of a roughness curve obtained by using a laser microscope, corresponding to the maximum height Ry of Japanese Industrial Standards (B0601-1994) except a reference length and evaluation length. Further, taking out the portion including no extraordinary high crest and low trough, which are regarded as flaws, is applied also as in the case of obtaining Ry.

[0011]

[Embodiment Mode of the Invention]

Given as the factors that cause Sn adhesion to a probe pin are the tip end shape of the probe pin, surface roughness of the tip end portion, and the material for the tip end portion. As shown in Fig. 2, the tip end of the probe pin has a sharp shape in which: a tip end surface is flat; and an angle a formed by the tip end surface and a side surface is about 95°. This portion is made to contact onto an electrode pad portion. Thus, for example, when the position or angle of the probe pin or semiconductor device is shifted slightly, there may occur the case where the contact area in contact becomes extremely small. The small contact area raises density of a current electrified at the time of the check, which leads to the rise of the temperature at the contact portion. Resultingly, Sn in a plated layer is melted to dissolve and adheres to the tip end of the probe pin.

[0012]

When the surface roughness of the tip end portion of the probe

[0032]

As regards the surface roughness, a sufficient evaluation length cannot be secured at the tip end portion of the probe pin. Thus, the surface roughness cannot be measured in accordance with Japanese Industrial Standards. In view of the above, a roughness curve was formed through the use of a laser microscope in the vicinity of the region where the contact between the tip end portion of the probe pin and the semiconductor device was expected, and the difference between the depth of the deepest trough and the height of the highest crest (the interval between a bottom line and a crest line) was adopted as the maximum roughness. With the purpose of confirming the validity of the measurement value, surface roughness Ry of the same material processed under the same condition was measured with the conditions of a reference length of 80 μm and an evaluation length of 0.4 mm in accordance with Japanese Industrial Standards (B0601-1994). The measurement results are also shown in Table 1.

[0038]

No adhesion of an Sn oxide was found at the tip end portion of each of the probe pins Nos. 1 to 5 of the present invention. In contrast, adhesion of the Sn oxide was found at each of the tip end portions of the probe pins Nos. 6 to 9 according to the conventional and comparative examples. Particularly, an adhesion amount of the Sn oxide at the tip end portion was large in the case of the probe pin No. 8 with large surface roughness.

[0039]

[Effect of the Invention]

The present invention is constituted as described above. Consequently, a probe card can be provided which prevents adhesion of Sn at the tip end of the probe pin and does not cause a false failure.

[Brief Description of the Drawings]

[Fig. 1) A schematic explanatory view of a probe card in which: Fig. 1(a) is a plan view of the probe pin; and Fig. 1(b) is a side view of the probe pin.

[Fig. 2] A view showing a shape of a tip end portion of a conventional probe pin.

[Fig. 3] A schematic explanatory view showing, in a longitudinal section, a shape of a tip end of a probe pin of a probe card of the present invention.

[Fig. 4] A schematic explanatory view showing, in a longitudinal